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OUR DENTAL HEALTH

NATURE provides each one of us with a 'permanent' set of teeth which, as the name implies, should last a lifetime. Yet during the present war, one out of every four army recruits aged 18–30 has had, or has needed, false teeth.

What has gone wrong, and why? As a people we have been singularly uninterested in these questions. We have concerned ourselves with dental health only when decay has become painful or our toothless condition has seriously impaired our personal beauty or our chewing efficiency. Then, with no thought for the causes, we have merely demanded the necessary repairs, removals or replacements.

It is true that we do not yet know, in an exact scientific way, all the factors which encourage dental health or lead to dental decay. But we do know that they are of two kinds—general and local. The teeth are living tissues and derive from the blood the materials they need for their development and maintenance. Their nutrition and health therefore reflect the nutrition and health of the body as a whole. But though these general factors determine the health potential of the teeth, local conditions in the mouth may prevent its full realisation. Even teeth with a first-class constitution can be broken down by bad living conditions.

In short, dental health depends upon the diet, the general health, the hygiene of the mouth and the standard of dentistry enjoyed throughout life—in that order of priority. It is therefore encouraging to find that the Interdepartmental Committee on Dentistry, while very properly recommending in its recently published interim report,* that "a comprehensive dental service should form an essential part" of the National Health Service, has underlined the vital importance of these constitutional and hygienic factors.

The Committee considers that "dental health education should deal with questions of diet and dental hygiene as well as stressing the need for regular inspection and treatment"; it recommends that "dental health education should be one of the essential parts of the advice given at maternity and child welfare clinics," and that "dental hygiene should form part of school routine"; it wisely does "not wish to separate dental from general health education"; and it agrees "with the Central Council for Health Education that valuable assistance can be given in dental health education by a central organisation." With all these suggestions we warmly concur.

* Command 6565, His Majesty's Stationery Office, 1944. 6d.

THE PROBLEM OF POVERTY AND SLUM HOUSING

By C. Metcalfe Brown, M.D., D.P.H., *Medical Officer of Health, City of Manchester*

"Almost all poverty is relative," said Malthus in 1798, and Rowntree in 1903 indicated that of the 20,000 found to be living in poverty in York, 13,000 were living in 'secondary poverty,' meaning that the income of the family "would be sufficient for the maintenance of merely physical efficiency were it not that some portion is absorbed by other expenditure either useful or wasteful." Both men clearly realised the true nature of poverty—and poverty has not changed in the intervening years.

'Slum' is a deplorable word for a deplorable condition. The dictionary refers to 'slum' as of cant origin, meaning by 'cant' that it belongs to the vocabulary peculiar to the disreputable. But, as Fowler says, "cant in current English means the insincere or parrot-like appeal to principles, religious, moral, political or scientific, that the speaker does not believe in, or act upon, or does not understand." One may well wonder whether Fowler was thinking particularly of 'slum' when he defined 'cant,' in view of our century-old appreciation of the evils of slumdom, and our century-old failure to remove them.

The causes of poverty are not far to seek. Poverty in the main is the direct result of unemployment, of fecklessness, of illness, or of a combination of these. Unemployment has been with us ever since the Industrial Revolution of the early nineteenth century, except during war. Fecklessness is to be found in all of us, temporarily in some, permanently in others, and the greater the degree of fecklessness, the greater the danger of poverty. Illness or injury may come to any of us, and no man may regard himself as free from the menace of poverty following ill-health—at least, in our present state of social insecurity.

The tragedy of poverty and of the slum is that there is no natural corrective—rather is the tendency for poverty and its results to draw their victims deeper into the mire. For example, unemployment brings lack of means—inability to buy food, shelter and clothing in adequate quantity. Ill-health is the bed-fellow of poor nutrition and lack of warmth. Recurrent ill-health means increased poverty, and increased poverty means more ill-health, and that in turn leads to incapacity for employment, even if employment is available. Nothing will break the vicious circle, nothing will release the victim except superhuman efforts against overwhelming odds—or community help. The community must help.

The History of the Problem

Let us consider how the problem arose. Before the dawn of the nineteenth century there were, no doubt, both poverty and slums. There were dark spots, economic and hygienic, in every community, but the population was sparse, and there were few vast conglomerations of buildings such as constitute our modern cities. Just as a river will in time cleanse itself of pollution, no matter how severe, so did the countryside and its people tend in the course of time to correct by natural means the errors of man.

In agricultural England industry flourished, but it did so on an individual basis. The workers produced their goods and marketed their wares, either in exchange for money or by barter, and thrived according to their own industry. Then came the Revolution, and the balance of agriculture and the natural cycle of replacement gave way to the productivity of the mechanised age. "To every action there is an equal and opposite reaction," said Newton —and the productiveness of the machine was matched by its destructiveness as typified by the slag heap, the fouled stream, smoke, grit and noise.

In place of the independent worker came the inventor with his machine, first water-driven and later steam-driven. Manufactured goods became abundant and cheap, financial systems were created for the purchase of supplies, present and future, and for the payment of wages whilst the goods were being traded. Huge factories grew up and the trek of the rural population to the factory areas began. In a short time the countryside was all but denuded of its workers, many of them forced to migrate to the town to seek employment in place of their own lost trade. And so the demand for houses round the factories was created—more houses and still more houses, and all as near to the factory as possible, because the factory needed all the working hours of the workers, and transport was exclusively ambulatory.

At that time the local authorities had no control over the development of land, and no byelaws to control the erection of buildings thereon. The necessity for providing cheap houses quickly and the lack of organised control, produced a low standard of building and accommodation and mass production, standardisation of plan and fitment and gross congestion of sites became the rule. A description of Manchester one hundred years ago refers to a block of 200 old dirty houses, mostly back-to-back with unpaved, uneven, rutted streets, without drains, and with swine foraging in garbage heaps and puddles. This block housed 2,000 people, ragged women and children were everywhere, and as many as 20 persons lived in a house containing only two rooms, a garret and a cellar, with one privy for 120 people. This Manchester scene was doubtless repeated a thousandfold in this and similar cities.

The Seeds of Reform

Poverty, death and disease may leave the community unmoved for a

long time, but "truth will come to light." Slums and poverty are the hotbeds of infectious disease. Disease knew no boundaries, and epidemics threatened rich and poor alike. Fear was no doubt as potent a lever as reason in providing the first move for reform.

The larger cities appointed Officers of Health. One of their main tasks, at first, was to cleanse the Augean stables—not like Hercules who turned the river Alpheus through them, for the rivers were as dirty as the slums—but by controlling new building and by enforcing good sanitary conditions. Another main task was the provision of hospitals for the isolation and the care of the infectious sick. Opposition was considerable—the reforms were deemed by many to be an unwarranted interference with liberty at an unseemly cost—but public opinion had been roused and became strong enough to back the programme of improvement of environmental hygiene.

Towards the end of the nineteenth century, a higher standard of housing became obligatory—wider streets, larger yards and better construction. Conversion schemes replaced the privy middens and pail closets, and fly and dust diseases became less rampant. The higher standard of housing demanded, and the consequent increased cost of housing improvement made it more and more difficult for the builders to provide houses at rents which tenants could afford. It became obvious that private building, if unaided, could not cater adequately for the lower income groups. And so municipal housing began.

The first efforts of the municipalities were somewhat faltering. High costs presented the main obstacle and experiments were made with common lodging houses and blocks of flats in several areas, but they never gained popularity. In the provinces at least most people wanted—and they still do—the privacy of a house with a garden and the amenities of increased light and air which such provision ensures. Attempts were made by local authorities and philanthropic societies to provide the cottage type of dwellings at rents within the capacity of the tenants, but these were few in number relative to the demand, and so the old dwellings, many of them slum, remained.

Meanwhile the public had imbibed some of the teachings of health education, still in its infancy, and the demand for new standards of life and hygiene increased.

The Growth of Reform

The country was shocked and public health efforts were stimulated by the publication of the findings of medical boards concerned with the recruitment of men for the forces in the last war, showing that very many young men were physically unfit. Among the chief causes recognised were bad housing, shortage of housing, overcrowding and malnutrition—in short, poverty and slums.

With the end of hostilities and demobilisation, the housing shortage reached its most acute stage, and enthusiastic and energetic government assistance was forthcoming in aid of huge housing programmes. Land, material and labour costs were high and time was needed to get such a huge scheme into its stride. The costs soon proved to be prohibitive, and the Government in a phase of economic retrenchment withdrew most of its aid and although many houses were built, the number was lamentably small in comparison with the need.

The Housing Act of 1930 brought the first really serious attempts at slum clearance. Surveys of proposed clearance areas revealed a high percentage of houses showing the classical defects of dampness, dis-repair, inadequate lighting and ventilation, and poor washing and sanitary facilities. The local authorities took energetic action, and battles royal took place at local housing enquiries between the representatives of owners of properties represented as unfit and the representatives of the local councils responsible for the clearance orders. The issues were strenuously fought at first, but gradually it came to be realised by most people that clearance of slum property was right and most urgent, and quicker progress was made. Meanwhile, up and down the country, thousands of houses were erected. But the hard core of the housing problem remained—housing was still in short supply and old buildings could not be demolished until new ones were built.

The Future of Housing

The community now finds itself in somewhat similar or even worse case than it did after the last war. Many thousands of houses, unfit before the present war, are still occupied. Repairs to houses, good and bad, have been largely in suspense owing to war conditions. Thousands of houses have been destroyed or irretrievably damaged by enemy action. Meanwhile, thousands of people live in unfit houses, thousands in overcrowded conditions, thousands have no houses at all, and to this latter number will be added thousands more when demobilisation takes place.

Labour, material and land are scarce. At the end of hostilities, labour and material will gradually become more and more available, but the land problem will still be difficult. Many of the large towns are hemmed in by other towns, and even where spread into the surrounding countryside is possible, increasing distance between home and factory increases the energy and cost required for increased travelling, and so produces the 'secondary poverty' referred to by Rowntree.

The alternative to sprawl available to the Town Planner is the creation of satellite towns—the provision of the complete housing of community life—the dwelling houses, the factories, the churches, the schools, the cinemas and all the other buildings which provide the background of modern

society. Such a policy can only be pursued subject to the solution of problems concerning the control of land and the direction of industry; problems which belong to the political sphere rather than to the medico-sociological, and there we must leave them.

The difficulties, as we have seen, are tremendous but not insurmountable. The size and gravity of the problem is fully realised by all progressive local authorities, who are "like greyhounds in the slips, straining upon the start." May they soon get the start and may they be able to provide the necessary houses within a reasonable period of years.

The Future of Poverty

As we have seen, poverty soon produces the vicious circle which is so difficult to break without outside assistance. Poverty means that the necessities of life must be purchased at the cheapest rate—if they are purchasable at all. In a free market, the house at the cheapest rent is in the nature of things the least desirable house; and so long as the demand for good houses exceeds the supply, as it has always done within living memory, the cheapest house will come within the large and lowest category of housing—unfit for human habitation. The unfitness of the house is aggravated by overcrowding—overcrowding because the low rent is still too high, and must therefore be shared by the largest possible number in the shape of a large family or more frequently by several families. Added to the discomforts and dangers to health of the overcrowded slums are the inadequate clothing and the inadequate food which follow inability to pay.

It is true that these are not the only causes of poverty—it is true that a section of the community will tend to fritter its income away when times are good and suffer accordingly when times are bad. Let us remember, however, that those who have been born and brought up in poor and unsatisfactory surroundings have thereby been educated to regard their habitual condition as the normal one, and the incentive to improve is consequently non-existent or at least impaired. The remedy for this attitude of mind is not abandonment. The remedy is mental rehabilitation—and what better background for health education could there be than a new home in a good house with undreamed-of amenities. Many of the old and middle-aged may be past redemption in this respect—but no child is past redemption in this or any other respect.

Slums and poverty have done much together in producing excessive death and morbidity rates, as comparative figures of the various wards of the towns and cities show. Where there is bad housing, overcrowding and poverty, there one will find a high general death rate and, worse still, that unfailing index of bad conditions, a high infant mortality rate.

Poverty should have no future. The measures for social security discussed in recent weeks in Parliament and elsewhere will, if implemented, cut at the

roots of poverty. The sick will be sustained during the course of their illness, the unemployed will be found work or if work is not available, adequate maintenance—and that not as a charity, not as a measure of Poor Law, but as an insurance return for the premiums paid to the social security funds.

Let there be one word of warning. We firmly believe that all slums can be demolished and new houses built in adequate numbers in their place, that poverty can be abolished from the land, that the spectre of want can be permanently banished. That can only be achieved on one condition—on the preparedness of all of us to work hard, to produce rapidly and well, because as Butler wrote, "for as you sow, you are like to reap."

In conclusion, slums and poverty are with us as they have been for many long years. The road to improvement and to abolition will be long and arduous, but the problem is capable of complete solution, and a nation which has endured successfully, and which is shortly to emerge triumphantly from a long and arduous war, is equally capable of surmounting the more difficult problems relating to the social welfare of the people. As Tennyson sang:—

"Men, my brothers, men the workers, ever reaping something new:
That which they have done but earnest of the things that they shall do:

For I dipt into the future, far as human eye could see,
Saw the Vision of the world, and all the wonder that would be."

EDUCATIONAL WORK FOR IMPROVED PUBLIC HEALTH IN THE U.S.S.R.

EDUCATIONAL work aimed at improving public health has reached mass production in the U.S.S.R. today. Five million lectures and talks have been arranged on this subject during the past two years and more than thirty-three million copies of popular literature issued, including ten million copies issued in the different languages spoken in the U.S.S.R.

Public health instructors have recruited many volunteers among the population to help them in their work. Medical workers are assisted by more than 300,000 such instructors. 170,000 Red Cross posts have been established in factories, at collective farms and in city suburbs. In Moscow alone there are 10,500 public health instructors including 1,000 at public catering enterprises. Students take an active part in this work. Moscow also has 25 district centres from which hygienic education is conducted among the population.

This widespread educational work has helped to preserve the country's public health at a high level during the present war and to prevent epidemics which are the usual concomitants of war.—E. K. NIKOLAYEV (*Member of the Soviet Scientists Anti-Fascist Committee*).

MAN'S ONLY SERIOUS COMPETITORS*

By W. N. Pickles, M.D., M.R.C.P.
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The idea of infection was one which dawned very slowly on the long line of physicians of old. Indeed, it cannot be said to have been clearly recognised by anyone before Frascatorious, who was born at Verona in the late fifteenth century and gave syphilis its name. But although he has the great distinction of recognising that certain diseases were transferred from person to person, he had no idea that living organisms were the cause. It was left to Leeuwenhoek, a draper of Delft, born in 1632, to discover with his improved microscope that such organisms did exist. He did not apply his discovery to the subject of infection, however, and we have to come down to modern times with Pasteur's great name and example in the van before we have a really clear understanding of the relationship of these living things to the diseases of men and animals.

Beginnings of Immunisation

But long before this happened much had been done by thoughtful physicians and definite opinions were held on immunity. It was recognised that a previous attack of smallpox was a protection against the disease and some unknown empiric found that the inoculation of matter from a smallpox lesion into a susceptible subject produced a milder form of the disease, and that this mild form was equally protective. Lady Mary Wortley Montague heard of this 'Greek practice' when her husband was ambassador to the Porte, and had her small son inoculated by a Greek woman. Later she set the fashion in England by inducing the well-known physician, Maitland, to inoculate a younger son. The whole of the story is told by Creighton, the historian of epidemics, in his inimitable style. How this practice, which was not free from danger either to the individual or the community, was replaced by the inoculation of the material of cowpox, is a long and romantic story with which most people are familiar.

So we come to the belief that most infectious diseases do not repeat themselves in the same individual, and a comfortable and happy belief it is. Take measles for instance. Rolleston, whilst allowing the possibilities, states that few second attacks have been recorded by reliable observers. Doctors are so often told by their patients that they have had two, three or even four attacks of measles, that it is good to be reassured by him on this point. During 30 years' work in the same country district and among the same

* Quoted with his permission from an address by Vice-Admiral Sir Sheldon F. Dudley, R.N., F.R.S.

people, I have never myself attended the same patient with this disease on a second occasion, and when I have been told by a patient that it is a second attack, I have generally been able to prove that the first was German measles and not measles at all.

It is not always easy for the layman to grasp that measles and German measles are two definitely distinctive diseases with a superficial resemblance, such as the hare has to the rabbit or the goose to the duck in the animal world. Low be it spoken, but the doctor himself may on occasion have some doubt in his mind as to which disease he is dealing with, especially when an epidemic of one immediately succeeds the other.

Periodicity of Epidemics

For practical purposes there is a solid immunity following an attack of measles and I have found that this has had a striking effect on the spread of measles in a scattered country district. With great regularity measles has appeared every nine years and swept through the countryside like a flame, claiming as victims the great majority of those who have not suffered before. In the intervening period it has always been introduced, but it has come to a dead end because the greater proportion of the children have this solid immunity.

I tried an interesting experiment in 1938 when the periodic epidemic was expected. The disease duly appeared in one of the villages at the usual time but the parents and school-teachers loyally co-operated with me in a process of rigid isolation, more especially of those who were by known exposure almost certain to develop the disease, and the epidemic was brought to an end. When measles has appeared since 1938, the same isolation process has been repeated in other villages and now we must look for the nine year incidence in individual villages, rather than in the district as a whole. To assess it at its lowest value this is of course much more convenient for the doctor.

In every epidemic a few, a very few, children will be unaffected or apparently unaffected. This has been assumed to be due to a symptomless or sub-clinical attack of the disease, which is sufficient to protect a child during the epidemic, but which fades in a year or two's time. Dr. Dwight O'Hara of Boston suggests, however, that the immunity of those of us who have had measles is reinforced by repeated small invasions from exposure to the disease as the years progress.

The nine year incidence has also been apparent in chicken-pox epidemics in individual villages, probably because children are usually attacked long before they reach secondary school age. The majority of them are therefore immune before they go to the Grammar School which serves a large area and is the great spreader of other infectious diseases throughout the country districts.

It is now well known that shingles and chicken-pox are mutually interchangeable as infections—that a sufferer from one or the other can infect a non-immune with either disease. Shingles does occur in those who have had chicken-pox, but it then appears as a negligible attack, so considering the suffering caused in later life from shingles, it would seem to be a great tragedy *not* to suffer from chicken-pox in childhood. Chicken-pox usually protects its victims from another attack of the same disease, but on one occasion and one only, I have attended a child with a second attack.

Gradual Immunisation

When we come to consider diphtheria and scarlet fever, the story is very different. There is a test of relative immunity in the case of the former disease (the Schick test), and it is found that a considerable proportion of town-dwelling adults give a negative response to this test, which means that they are immune. The test is carried out by the injection of a small amount of diluted diphtheria toxin into the skin. In due course this produces a red area in the injected part of the skin in susceptible individuals.

At some time or other town-dwellers harbour the diphtheria germ in their throats or noses. Some develop the disease, but the great majority show no clinical signs although their bodies have reacted to the toxin by producing antitoxin. This contact with the germs of diphtheria is repeated several times, until in this way the antitoxin in the blood reaches a high level and a definite immunity built up against the disease. This does not happen to the same extent in a country district, however, and so it is even more necessary to carry out strenuous immunisation campaigns in the country than in the town.

Precisely the same occurs in the case of scarlet fever, so accounting for the failure of quite a number of contacts to fall victims. Relative immunity to scarlet fever is detected by means of the Dick test, which is similar in principle to the Schick test.

One Organism, but Many Diseases

Scarlet fever is a difficult disease to understand. It is now held that the causative organism is the haemolytic streptococcus, but this organism is also the cause of many other diseases—septic sore throat, erysipelas, various forms of abscess and inflammation and most important, puerperal fever.

Those of us who are familiar with epidemics of scarlet fever know that in addition to the patients with rashes, who are the only ones who are notifiable as scarlet fever, many others suffer from a similar sore throat. These are not susceptible to the rash factor in the disease and would give negative responses to the Dick test, but all the same might and do infect others, who actually do develop typical scarlet fever.

The following sequence occurred in my practice some years ago. A young

married woman had a very typical scarlet fever throat, followed by a septic pharyngitis with quite alarming symptoms, suggesting oedema of the vocal cords. Her elderly mother, who nursed her, also developed a sore throat and then a most formidable attack of erysipelas, from which she only just managed to recover. Then the young woman who looked after the mother contracted a septic finger and an abscess in the armpit with inflammation spreading to the breast, and was laid up for some weeks.

Does one Attack confer Immunity?

In the experience of doctors who have remained in the same district and looked after the same patients, scarlet fever does attack the same patient twice, but in very rare instances. The chances of exposure to diphtheria in a country district are rare, but it is my experience that all my patients who have suffered from diphtheria are still Schick positive and therefore liable to further attacks. It seems to me therefore that the antitoxin treatment whilst curing the patient actually inhibits the natural production of antitoxin which would be expected to occur if the patient had survived without treatment. The possibility of survival would be greatly reduced, however, if antitoxin were withheld.

Now, what immunity if any is there to the common cold, the average incidence of which is said to be three attacks in each individual per annum? Possibly the frequency of colds is all to the good because it is common knowledge that if there is freedom from colds for a long period, the final attack is a very severe one. So it seems that an attack confers partial immunity and that this prevents the real 'snorter.'

There is some evidence that protection is also conferred by an attack of influenza. If one takes the trouble to record the names of those suffering in succeeding epidemics, say the 1937 and the 1943 epidemics, one is surprised how rarely the same name occurs twice. I do not suggest that there is absolute protection, but that there is some evidence of partial protection. Those of us who early in 1918 developed the disease in the mild form of the first wave were indeed fortunate, as this did appear to give some protection against the much more dangerous disease in the wave of the autumn and winter. It is a matter of speculation whether there will be another pandemic with the terrible mortality of this second wave during the present war.

There is no scientific explanation of the genesis of epidemics and we cannot wonder that earlier searchers after truth fell back on the conception of an epidemic constitution of the atmosphere. We ourselves have nothing more positive to offer.

An Interesting Episode

There is, however, some evidence of the reason for the change of type between the two influenza waves in 1918–19. First, there is the evidence

contained in the graphic story told by Dudley, who is now Medical Director General of the Royal Navy. Leaving England in August, 1918, H.M.S. *Mantua* had a brisk epidemic of influenza, beginning two days out from England. Before the end of a fortnight 200 victims were claimed. This epidemic appears to have been of a mild type, but the ship was now coaled by coolies at Sierra Leone and a very severe epidemic succeeded ashore. Men from H.M.S. *Africa* assisted in the coaling, and there was a truly appalling sequel. H.M.S. *Africa* set sail for England and on her voyage 75 per cent of her crew of 779 was affected, and 51 of these died.

The explanation of this change in type was thought to be the repeated passage of the disease through susceptible negroes, causing a stepping-up in virulence. As Dudley puts it, the *Africa* now returns to England, bearing a cargo of bacterial strains of increased virulence and infectivity for use in the autumn wave of the epidemic.*

Dr. Burnet, the Australian epidemiologist, also stresses the part played by the mixing of men of two continents at Brest, the chief disembarkation port for American troops, many of whom were from the open spaces and presumably as susceptible as the West African Native. On such coincidences, the increased virulence seems to have depended and it is at least doubtful whether similar coincidences will again increase the virulence of influenza should it become rampant in the present war. The practice of maritime quarantine in the case of influenza is a very sound one, however, and I am one of those who believe it should be largely practised. Certainly had the *Mantua*'s yellow flag floated for a safe period at Sierra Leone, a great catastrophe would have been prevented.

General Health no Safeguard

There is a popular belief, indeed a belief held by many doctors, that an individual's general state of health is some safeguard against infection. Looking at the 1918–19 epidemic, one can gain small comfort from this, as it was the fit young people who largely suffered. We must look to the state of the blood—whether it contains the necessary antibodies to the disease—as the only real protection.

No amount of malnutrition or general ill-health, no amount of exposure to the disease, will produce measles, mumps or whooping-cough in a child who has already suffered from these diseases. Anyone who has not acquired immunity from a previous attack is fair game for the invader.

It is often assumed that older people will not 'catch' children's complaints, measles, whooping-cough and the like, but their freedom is due only to the fact that they have already had these diseases. It is true that occasionally one comes across a sufferer from whooping-cough in old age, but it is possible that the immunity has worn thin. For instance, I heard the other

* This was before the isolation of influenza virus.

day of an old physician, who was said to have had whooping cough in 1815 at the age of 5 and to have died from the disease in 1900 at the age of 90. He distinctly remembered his first attack. This suggests that immunity does not always hold good at the end of a long life.

Active and Passive Immunities

We have seen that in the past attempts were made to produce an artificial immunity against smallpox by inoculation of the material from the disease and later by inoculation of material from a modified form of the disease in the cow. The field has been widened in recent years. There are two ways of producing immunity. One is by introducing into the body serum from some animal, generally the horse, in which an antitoxic response has been produced by injection of a toxin. The serum thus obtained is given as a prophylactic or preventative to people who have been exposed to the disease concerned. Instances of this would be the injection of anti-diphtheritic serum in a child exposed to diphtheria infection and of anti-tetanic serum in a soldier who had been wounded while fighting in an area of highly cultivated soil, where the tetanus bacillus was probably present.

This protection is transitory, however, and is only to be applied on such urgent occasions. Active immunisation has a much larger field and the protection it gives is more durable. It has been tried out in diphtheria with much success. Diphtheria toxin is modified in many ways, the most successful of which, and the one now most largely used, is precipitation by alum. This modified toxin produces a defensive response in the body of the inoculated, which gives a relative protection against the disease. The result is that in certain cities of Canada, where the practice has been universal, not only has the disease disappeared, but the actual organism, as judged by throat swabbing, seems to have vanished completely.

In the last war the inoculation of a sterilised culture of the typhoid bacillus banished typhoid as a serious menace for the first time in the history of war. In the present war, especially in the American Army, protective inoculation has been practised against a variety of diseases. The American soldier has to consult his records to find out against which diseases he has *not* been inoculated. As a result of anti-typhus inoculation, both in the American armies and our own, there was a striking difference in attack rate between these armies and the Italian armies in North Africa.

So continues the fight against what Dudley has called 'Man's only serious competitors' and a time may come when the infectious diseases neither interfere with campaigns nor cause their wonted havoc in peaceful times.

OBITUARY

THE Central Council for Health Education has suffered a very painful loss in the death of its President—the Most Reverend William Temple, D.D., Archbishop of Canterbury and Primate of all England. He was only 63 years of age and had an influence and power over the minds of the English speaking people which is given to few. His father, Frederick, had also occupied the Chair of St. Augustine and died when William, at twenty-one years of age, was at Balliol. At Oxford William took a first in 'Greats' and was President of the Union. He was a don at Queen's for six years and then became headmaster of Repton at the early age of twenty-eight. After four years there he came to London as incumbent of St. James's, Piccadilly. In the autumn of 1918 he resigned this living in order to give his whole time to preaching and speaking all over the country for Church Reform as Chairman of the Life and Liberty Movement. In June, 1919, he was appointed to a canonry of Westminster Abbey and eighteen months later to the See of Manchester. During the eight years he spent in the diocese, he made his powerful influence felt in the many problems of that great industrial area. In January, 1929, Dr. Temple was enthroned as Archbishop of York in succession to Archbishop Lang, whom he again followed on his retirement from Canterbury in April, 1942.

These are the bare bones of the career of one of the most outstanding figures of our day. He had always taken a wide view of his responsibilities. For sixteen years he was President of the Workers' Educational Association. He gave much time to supporting the Student Christian Movement and to missionary work among undergraduates. He was always interested in 'moral welfare' work. When, therefore, the time came, in the summer of 1942, for a successor to be found to Lord Eustace Percy, the first President of the Central Council for Health Education, there was unanimity in the desire that Dr. Temple should be invited. It might have been thought that with his heavy commitments he would be impelled to decline, but on receiving the invitation, through the Minister of Health, he accepted at once. He took his duties seriously and was no mere figure-head. He delivered a stimulating address to the Council at the Annual Meeting in July, 1943, and attended the meetings of the Council whenever his other engagements permitted. He addressed the Council's Conference on Venereal Diseases in 1943 and made seven specific suggestions for combating these evils. He also took the chair a year ago at an important conference arranged by the Council with religious leaders.

Though nothing would deflect him from his intense loyalty to the Church he was no narrow sectarian and, as a result of his broadmindedness, he had great influence with all Christian denominations. He was always approachable and gave much sage counsel to the officers of the Council whenever they consulted him.

So passes a truly great man in the prime of his power. He was urbane and genial —his witty comments, accompanied by his enormous chuckles of delight, brought the most obstreperous speaker to a sense of realism. His grasp of the real points of a discussion, his outstanding intellect and philosophical approach, made a rare combination. Withal he was very human, as anyone would realise who had had the pleasure of hearing him sing from his repertoire of Gilbert and Sullivan songs.

He was indeed a 'man' in the Kipling sense:—

"If you can talk with crowds and keep your virtue,
Or walk with kings nor lose the common touch,
If neither foes nor loving friends can hurt you,
If all men count with you but none too much."

W. A. D.

Photograph by] [*Walter Stoneman, Baker Street, W.1.*

THE LATE DR. WILLIAM TEMPLE
Archbishop of Canterbury
and
President of the Central Council for Health Education

THE DOCTRINE OF DEVELOPMENT IN CHILD CARE

By Arnold Gesell, M.D., Ph.D., Sc.D., *Director, Clinic of Child Development, Yale University, U.S.A.*

Maturation and Acculturation

Please permit us the word *doctrine*. We shall not use it dogmatically, but as the equivalent of a set of guiding principles recommended for consideration. The new concepts of child development are a corollary to the doctrine of evolution. Since Darwin's epochal work we have come to look upon all the large long-range phenomena of life in evolutionary perspective. But we have scarcely begun to apply a comparable perspective to the marvellous succession of events compressed in the narrow range of a child's growth career.

These events, likewise, have a lawful sequence which was in fact determined by aeons of racial evolution. Infancy is itself a product of evolution. Darwin's genius grasped this profound truth. Indeed he converted the enigma of infancy into one more touchstone for understanding the origin of species. I like to recall that in 1881 he wrote with characteristic courtesy, an eight-page letter to the Secretary of The American Social Science Association, expressing his interest in the Register of Infant Development which this association was then compiling. He suggested that very little was accurately known about the mental and bodily development of infants, but that such knowledge "would probably give a foundation for some improvement in our education of young children."

From the vantage ground of post-Darwinian science, we begin to see each child as the focal end-product of age-old processes of evolution. As a member of the human species, the infant inherits certain biological characteristics which cannot be transcended. As a member of a family he inherits from parents and grandparents certain potentialities and aptitudes which also are part of his native constitution.

These inborn traits determine his growth capacities and to a great degree his modes of maturing. To be sure, he is born into a culture which will configure and canalise his growth. The culture assimilates him and he assimilates the culture. Anthropologists call this the process of *acculturation*.

A biologist, however, would insist that the whole process is delimited and primarily patterned by the intrinsic mechanisms of *maturation*, the growth determiners inherited through the species and through familial ancestry.

This paper will stress the importance of maturation in the management of children and in the social planning of measures of child protection.

The Nature of Mental Growth

The concept of maturation applies with equal force to body and mind. To avoid any unnecessary antithesis, we may think of the child as an action-system. His body grows; his behaviour grows. He comes by his mind in the same way in which he comes by his body, that is, through processes of development which produce maturing patterns of behaviour.

Mental growth is a rather elusive reality. Growth is a process so subtle that it cannot be perceived. And for ordinary vision the mind is utterly insubstantial. Yet the growth of the mind in its first years constitutes the subject matter of this paper. How can we make this elusive reality less elusive?

First of all we must agree to think of growth not as an empty abstraction but as a living process, just as genuine and as lawful as digestion, metabolism, or any physiological process. We must also think of 'the mind' as being part and parcel of a living organism. As such the mind has form, contour, tendency, and direction. It has 'architecture.' It is as configured as the body with which it is identified. It reveals this configuration in modes of reaction, in patterns of behaviour. Mental growth is a process of behaviour patterning which organises the individual and brings him toward a stage of psychological maturity.

The metaphysics of the relationship between body and mind need not concern or confuse us here. We simply suggest that there are laws of growth and mechanisms of development which apply alike to body and mind. Growth is a patterning process whether we think of its physical or mental manifestations. The embryologist is particularly interested in the transformations of bodily structure; the genetic psychologist, in transformations of behaviours. Both embryologist and psychologist investigate the shape of things to come and the shape of things becoming.

For example: The embryologist finds in the tiny human embryo at the fourth week of intra-uterine life, a pair of 'buds' just behind the gill arches or neck region of the trunk. They are limb buds. They grow. Note the remarkable transformations of this pair of diminutive stumps. (1) Cells penetrate into the stumps causing them to elongate. (2) Some of these cells change into a skeleton or framework of three segments (future arm, forearm, and hand). (3) The outer segment (future hand) assumes the shape of a paddle. (4) Five lobes appear on the edge of the paddle. (5) A skeleton penetrates into each lobe and provides it with three or four bony segments.

Thus the paddle transforms into a five-fingered hand. Muscles and tendons attach themselves to the skeleton of arm and hand. Nerve fibres penetrate

the muscular tissue; nerve endings ramify into the joints; tactile end organs by the thousands, like so many sentinels, establish themselves in the sensitive skin which envelops the growing hand and arm.

Soon, very soon, this arm and even the fingers will make characteristic movements, spontaneous, reflex, and induced. The mind has begun to grow! For what are characteristic movements but patterns of behaviour? And mental growth is a process of behaviour patterning.

Even in the limb bud stage, when the embryo is only four weeks old, there is evidence of behaviour patterning: the heart beats. In two more weeks slow back and forth movements of arms and legs appear. Before the twelfth week of uterine life the fingers flex in reflex grasp. Increasingly complicated postural movements take form: the trunk curves and straightens; legs and arms flex, extend, rotate; the head moves from side to side and up and down. By the time the embryo, now properly called a fœtus, is five lunar months old, it has an astonishing repertoire of behaviour patterns.

At this age the future infant is a foot in length and a pound in weight, but he is already far advanced in his bodily and behavioural organisation. He is distinctly human in his lineaments. He is not unduly compressed by the confines of the uterus, but maintains a partially free existence in its fluid medium. His postural attitudes somewhat resemble those which he will assume in his bassinet. He makes lashing movements of arms and legs (quickening). His skin is sensitive and responds to stimuli. He even makes rhythmic movements of the chest—pre-respiratory movements in preparation for the event of birth, another five months hence, when the breath of postnatal life will rush into his lungs.

It is well to realize that even at this early age the fœtus has attained such a high degree of behaviour organisation. It seems as if Nature hastens the growth of the organism as a safeguard against the contingency of premature birth. Fortunately, if the attendant complications are not too severe, an infant born eight weeks before normal term may survive and undergo a relatively normal behaviour development.

The fœtus at the age of five months is already in possession of twelve billion (or more) nerve cells which make up the human nervous system. This is the full quota, all that the individual will ever have. Many of these cells have already established functional connections among each other and with muscle fibres; many more cells, particularly those of the brain cortex, are still fallow. As the fœtus grows, as the infant grows, and as the child grows, these nerve cells become organised into patterns of responsiveness, or into reaction systems. These neuron patterns determine behaviour. They are influenced by the constitution of the blood, by endocrine hormones, and by electro-chemical regulators; but in a fundamental sense, the patterning of the mind is inseparably identified with the microscopic and ultramicroscopic patterning of nerve cells.

The growth mechanisms which produce these earliest behaviour forms, do not cease to operate at birth. They are active throughout the whole cycle of psychological development.

At the Yale Clinic of Child Development we have made a systematic survey of the development transformations which characterise the first five years of life. Normal infants were examined under controlled but home-like conditions with the full co-operation of the parents. Great care was taken to secure natural and optimal behaviour. Extensive cinema records were made at lunar month intervals during the first year of life and at lengthening intervals later. These records were subjected to minute inspection, and analysed as so many anatomical cross-sections of behaviour patterns. The home behaviour of the infants was also explored. On the basis of these periodic observations, it was possible to define the behaviour characteristics typical of a series of advancing age levels: 4, 16, 28 and 40 weeks; 12, 18 months; 2, 3, 4, 5 years.*

Four major fields of behaviour were embodied in these norms of development as follows:—

(1) Motor behaviour: posture and locomotion; prehension and manipulation; gross and fine motor co-ordination.
(2) Adaptive behaviour: self-initiated and induced behaviour; learning; resourcefulness in adjusting to new situations; exploitive behaviour.
(3) Language behaviour: vocalisations; vocal signs; words; gestures; comprehension.
(4) Personal social behaviour: reactions to persons; response to gesture and speech; socialised learning; habits of self help.

Sequences of Developmental Maturity

The child grows as a unit. All of the foregoing types of behaviour are phases of a single action system. And all are subject to the inherent mechanisms of growth which we call *maturation*. All development follows natural sequences.

We call the sequences natural because they are due to the child's very nature. Maturation represents that position or aspect of growth which springs from the child himself. Let us illustrate with concrete examples of motor behaviour.

No one really teaches a child to creep, to stand, to talk. We may encourage, we may offer opportunity; but he 'learns' by himself. He passes

* The results of the developmental studies of the Clinic have been reported in various publications, including, *An Atlas of Infant Behaviour* (two volumes, illustrated with 3,200 action photographs), and in a medical manual on *Developmental Diagnosis: Clinical Methods and Practical Applications.*

through twenty distinguishable stages, all in due sequence, before he assumes the upright posture—in outline, as follows:—

Stage 1, *passive kneel.* Both arms and both legs are symmetrically and sharply flexed. Cheek contacts platform.

Stage 5, *swimming.* Back arches so that the infant's weight rests on abdomen and lower chest. Head lifts 90°. Arms and legs lift symmetrically.

Stage 10, *pivoting.* Arms and legs flex and extend alternately, causing trunk to pivot.

Stage 13, *crawling.* Infant pulls self forward on abdomen, by extending and flexing forearms.

Stage 16, *rocking.* Infant elevates trunk, rests on hands and knees, and sways back and forth; but remains in one location.

Stage 17, *creep-crawls.* He progresses by pitching forward from a creep position.

Stage 18, *creeps.* He progresses by hands and knees.

Stage 20-23, *stands and walks.*

This, in brief outline, represents the typical developmental route by which the quadrupedal infant becomes a locomotor biped. There are individual variations of this route; but there are no magical, or even cultural, shortcuts. Here we see the mechanisms of maturation in bold relief. The organisation of motor capacities proceeds in orderly sequence, in a cephalocaudad direction (in accordance with the law of development directionality). The head leads, torso, legs and feet follow in due order. Crawling comes before creeping, and creeping before standing.

Similar sequences govern the basic development of child in all aspects of his psychology—in his intelligence (adaptive behaviour), in his language, in his personality (personal-social behaviour). As we learn more about the actual structure of the growing mind, we always find maturational limitations which cannot be transcended; but which can be utilised in the interests of health and education.

Training and Maturation

In highly identical twins nature provides us with two individuals who have almost the same hereditary endowment. Because their genes are so very nearly identical, such twins exhibit very similar sequences of maturation. We can use them instructively as experimental subjects to determine the reciprocal relationship between training and maturation.

We have described elsewhere the method of co-twin control which we used to analyse the influence of training in relation to maturity. Having established the presence of a thoroughgoing similarity of a pair of infant girl twins, one twin (Twin C) was utilised as a duplicate control. Twin T

was subjected to a programme of daily training in climbing an experimental staircase of five treads. This special training extended over a period of six weeks, beginning at the age of forty-six weeks. Twin C (reserved as a control) was deprived of all specific training in stair-climbing. At the age of fifty-three weeks Twin C was subjected to a brief period of training in climbing, lasting two weeks. The purpose of this deferred training was to check and to extend the analysis of the interdependence of maturity factors and training factors. Twin T's early reactions to training were relatively passive, and she needed assistance at one or all of the five treads. After four weeks of training (age fifty weeks) she climbed the staircase with avidity and without assistance. At fifty-two weeks she climbed the staircase in 26 seconds. Twin C, at the age of fifty-three weeks, without any previous training, climbed the same staircase unaided in 45 seconds. After two weeks of training, at the age of fifty-five weeks, Twin C climbed the stairs in 10 seconds. The climbing performance of Twin C at fifty-five weeks was far superior to the climbing performance of Twin T at fifty-two weeks, even though Twin T had been trained seven weeks earlier and three times longer. The maturity advantage of three weeks of age must account for this superiority.

We may consider this to be an experimental demonstration of the primary importance of maturation as opposed to learning in its limited sense. Similar experimental studies were made in the field of adaptive behaviour (block building activities, vocabulary and manual co-ordination). In all these instances, the effects of preferential training of Twin T proved to be relatively impermanent. The untrained twin attained equivalent skill in these functions as soon as she reached the requisite maturity. Numerous tests at advancing ages revealed an amazing parallelism in the physical and mental growth of Twins T and C. Such developmental correspondence can be explained only through maturational mechanisms.

In summary, then, a child comes into his biological endowment through the innate processes of growth which we have called *maturation*. He comes into the social 'heritage' of culture through a process of *acculturation*. These two processes interact and interfuse but the process of maturation is most fundamental—so fundamental that acculturation can never transcend maturation.

Infants are individuals, because the intrinsic forces of maturation operate to keep them from being the mere pawns of culture. The impacts of culture are incessant and often they tend to produce uniformity, but even the tender infant preserves an individuality, through the inherent mechanisms of maturation. We may be duly thankful for this degree of determinism. Did it not exist, the infant would be a victim of the malleability which behaviorists once ascribed to him. He is durable as well as docile. In a boundlessly complex world he says, in effect, "Lo, I too am here!"

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BIOGRAPHICAL NOTES

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SLEEP AND RELAXATION

By Aubrey Lewis, M.D., F.R.C.P.
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People sometimes bemoan the waste of a third of their lives in sleep; they view this recurring interruption of their daily activity as a total loss. Such people have evidently not suffered from insomnia, and they have not reflected on the biological need which sleep satisfies. A new-born baby sleeps almost continuously. As it grows older, cortical functions develop, which, in interplay with hypothalamic activity, enable it to keep awake; the period of wakefulness is gradually consolidated into one stretch every day, and this stretch gets longer as the years go by: but a considerable instalment of sleep remains as necessary for man as for other animals.

Effects of extreme Sleeplessness

This necessity has been well demonstrated by experiments in which people have voluntarily gone without any sleep for three or more days: most of the subjects have remained awake continuously for about 65 hours, but Kleitman probably holds the record with 180 hours. Outwardly the sleepless person appeared quite normal in these experiments, except for his obvious sleepiness which required incessant supervision to prevent him from dropping off. If he sat or lay down for a moment, or even closed his eyes, he would go to sleep and if instantly awakened he would be resentful and irritable. He would sometimes develop visual hallucinations, or make inappropriate remarks during a conversation; questioned about these, he would say he had been talking on some subject which had not in fact entered into the conversation. He would not be able, after the first twenty-four hours, to apply himself to reading or study, and if he tried to write (for example, take notes at a lecture) he would make many slips and scribble unintelligibly; if he tried to count his pulse, he would lose track of the numbers after he had reached 15 or 20. Heart rate, blood pressure, basal metabolism, temperature, appetite, and composition of blood and urine remained as usual. The same was on the whole true of certain tests of the central nervous system, e.g. the knee jerk, response of the pupil to light, visual acuity, sensitivity of the skin to faradic stimulation and to touch, cortical brain potentials, and electrical skin resistance. In other tests, however, the subjects did less well than normally: viz. mental arithmetic; naming the opposites to specified words; naming colours; reaction-time experiments using visual and auditory stimuli; memory; learning; and motor speed and accuracy. The performance fell off as the period of sleeplessness lengthened, though there were fluctuations during the course of the day. The most extreme authentic instance of wakefulness on record is that of a somewhat eccentric young man who remained awake for 231 hours; on the fourth day

he developed hallucinations, then "became more and more confused and irrational, did not know where he was, and accused the observers of trying to ruin the experiment. He developed delusions of persecution and became so unmanageable that the experiment had to be discontinued." It is evident that prolonged interference with sleep is harmful to higher cerebral functions. Short periods of sleep deprivation, however, produce much milder effects, which can be repaired by a prolonged sleep.

Individual Sleep Patterns

It is perhaps unnecessary to invoke such Spartan experiments to prove that human beings need sleep. Ordinary people prize 'sound, refreshing sleep' as one of the chief necessities of life. There is, however, anything but unanimity as to what constitutes sound sleep. Some make duration the criterion, others stress depth, and others the feeling of being well rested after waking. Facility in falling asleep, or lying still at night (rather than 'tossing and turning'), are what others would put as the hallmark of good sleep; and there are some who insist that dreamless sleep is the best kind.

This diversity reflects the cardinal fact about sleep: that everybody sleeps in his own way. Many observations have shown that each person has his own 'posture patterns' during sleep; and the same particularity can be found in most of the other phenomena. We sleep as individually as we talk and walk: we dream as individually as we think. We are not well acquainted with our own behaviour during sleep, for obvious reasons, and we are for the most part unfamiliar with other people's. Consequently few were aware, until Szymanski (and later Johnson) instituted inquiries into the matter, that almost all normal people change their position many times during the night, and that the amount of a healthy person's movement may increase by 50 per cent without his having any subsequent suspicion that he had been more restless than usual that night.

Since we have such individual ways of sleeping, it is not possible to lay down absolute criteria of what is healthy sleep. We cannot say that every adult should have eight hours; that he should lie on his right side; that he should wake up promptly, with no recollection of any dreams; or satisfy any other of the criteria of healthy sleep that have been put forward. There can therefore be no hard and fast answer to many of the questions that are asked as to how to ensure the best kind of sleep.

Some questions, however, permit of a general answer that holds good for most people. Thus a regular way of arranging one's activities, especially in the evening, is conducive to sound sleep: so one should adhere to a general order, which, though often infringed, will remain the habitual pattern of one's evening existence. If a man finds he can vary his activities so much that there is no such pattern, and yet sleep to his own satisfaction and well-being, so much the better; but most people cannot, except for short periods.

Preparation for Sleep

Ritual in preparation for sleep is a common indication of this need for regularity. Some people, if they want to go to sleep easily, must lie in such and such a position, have so many pillows, take or not take this or that to eat, smoke a cigarette, read a dull book, have the window open or shut, take a bath last thing at night, and so forth. These harmless devices undoubtedly help some people to get off promptly into a sound and refreshing sleep (whereas for others they would banish it as effectively as benzedrine or an adjacent snorer). Geoffrey Evans upholds the value of prayer for this purpose. The familiar recipe about counting sheep, etc., refers to a sort of mental ritual which often fails to achieve its aim: it is mostly used by the sleepless, whereas the others just mentioned are resorted to as part of the normal preparation for sleep, much like emptying the bladder and putting out the light.

Such matters as the number of blankets, the best time to go to bed, the kind of mattress, the ventilation, or the desirability of an afternoon nap must be decided by the individual, or for him: there is no right and wrong which applies to everyone, though general physiological and climatic factors must of course be taken into account.

It is hardly necessary to say that emotional disturbance can interfere with sleep; it might be added, therefore, that emotional upheavals should be avoided if it were not that such an injunction is rather futile. The psychological causes of insomnia, when it is sufficiently troublesome to need treatment, are of the greatest importance in handling this distressing symptom; but since it is only a symptom, treatment of it must be directed beyond the immediate details of preparing for sound sleep. In this short article which deals with the hygiene of normal sleep no attempt is made to discuss the treatment of habitual insomnia and other disorders of sleep.

The use of drugs does not enter into the hygiene of normal sleep, except perhaps under such conditions as those which prevail in a city subjected to frequent nocturnal air raids. It is doubtful even then whether self-medication with sedatives should be encouraged, as has been advocated; but here again the temperament, duties, stresses, and habits of the individual must be fully weighed. If on infrequent occasions a person has to change his sleeping habits greatly, e.g. if he has to make a long train journey at night once a month and is lucky enough to have a 'sleeper,' there would be no harm in his taking five grains of medinal or some similar barbiturate, assuming that he finds that he sleeps badly in the train otherwise and that this small dose of sedative suffices to give him a good night's rest. But the pharmocology of sleep is too large a question to touch on here. The same may be said of the various forms of hydrotherapy that have been advocated, notably by Vogler.

How Long Should Children Sleep?

Although children require more sleep than adults, there are no exact rules.

Children are educable in this respect as in so many others, and a great variation in sleeping habits, and in hours of sleep, can be found in healthy children of the same age. The child's natural sleep rhythm should not be overlooked; if, for example, the afternoon nap interferes with the onset of sleep in the evening, it had better be dropped, since going to bed at night and going to sleep should remain closely connected in the child's mind and practice. Broadly, a child in his second year requires 13 to 14 hours' sleep, including his two-hour afternoon nap; the duration of the latter may presently get shorter, and will, after it has been steady at about an hour for some time, be given up altogether. By the end of the fifth year, eleven or twelve hours will be adequate; more intelligent children at that age are said to take less sleep than the rest, and there is no evidence that they are any the worse for it. By the age of 13 the child usually requires 9½ to 10½ hours, though some children do well with only 8½ hours. The more intelligent among these older children reverse what was apparently the case in their pre-school days; from about seven onwards, according to Terman, they sleep longer than the average child, possibly because the greater mental activity of the gifted child makes him more fatigued and in need of a longer period of recuperation.

Importance of Relaxation

Muscular relaxation is the normal preliminary or concomitant of falling asleep. This relaxation comes about half a second after the change in the electroencephalogram (viz. disappearance of alpha rhythm) which usually accompanies the transition from drowsiness to the 'floating' or 'drifting off' feeling that ushers in light sleep. Relaxation may be utilised to hasten the onset of sleep. Coriat demonstrated in 1912 that if a normal man relaxed all his muscles so that any limb if elevated would fall by its own weight, he would usually fall asleep in a quarter of an hour, even though he had recently had ample sleep. This was in keeping with the animal experiments of Sidis some years before in which he had induced sleep in guinea pigs, cats and dogs (as well as children) by getting them into an immobile state in which their limbs relaxed. The more tense the subject initially the less likely is he to relax adequately and to fall asleep. Edmund Jacobson has advocated a method of lessening the muscular tension; his approach is mainly physiological. Other methods are in use, some of them of great antiquity. It is impossible to detail these methods in a sentence or two. Jacobson's technique is probably the most satisfactory for the doctor to use if he is disposed to teach his patients how to relax. Training in deliberate relaxation, which may be furthered by various extraneous devices, cannot be regarded as in itself a method of treatment for insomnia, nor as a normal way of inducing sleep in healthy people; it is an adjuvant, providing by training what most people attain unintentionally when they settle down to go to sleep.

ANIMAL PARASITES

By Geoffrey Lapage, M.A., M.D., M.Sc.
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The Nature of Parasitism

The human mind, for several reasons, is usually biased against the parasite and finds it difficult to study it without prejudice. To the biologist, however, who studies it as one kind of living organism amongst others, the parasite reveals itself as a creature which is far from repulsive. On the contrary, it shows us some of the most interesting and beautiful adaptations to modes of life that can be found in the living world. If we wish to understand the damage that a parasite can do and to try to limit its activities, we must study it with the imaginative sympathy which all living things deserve.

The parasite always does some degree of damage. It lives with another animal or plant, which is called its host. It must be distinguished from the commensal organism, which derives benefit from another but does it no harm (e.g. the amœba called *Entamœba coli* which lives on the bacteria in the human bowel but causes no disease); and from the symbiotic organism which lives with another to their mutual benefit (e.g. the pond animal *Hydra viridis* and its contained green alga).

Possibly some parasites began to be parasitic (i.e. to do damage), when a commensal or symbiotic association went wrong. But it is much more likely that most parasites began by getting into animals or plants in which they at first did a great deal of harm and often killed their hosts, a few of the hosts surviving and their offspring gradually adapting themselves to the depredations of the parasite. Thus a host-parasite relationship slowly became established which enabled both host and parasite to survive.

Such a host-parasite balance now exists between healthy sheep and the roundworms in their intestines. In a similar way we all harbour bacteria and viruses which are the causes of serious diseases such as diphtheria and influenza, but we do not get these illnesses until something lowers our health and resistance and so enables the parasites to get the upper hand. That is why it is so important to keep our level of general health high. A person who is harbouring a pathogenic parasite in this way without actually suffering from the disease is called a 'carrier' of the disease, because he is carrying the cause of it about, and is always liable to infect other people.

Classification of Parasites

Most animal parasites are members of one of four great divisions of the Animal Kingdom. They belong either to the group of single-celled animals

called the 'Protozoa' (e.g. the parasites which cause malaria and sleeping—not sleepy—sickness), to the Flatworms (e.g. the tapeworm and the fluke), to the Round—or Threadworms (e.g. *Ascaris* and the pinworm of children) or to the group of Arthropoda or joint-footed animals (e.g. the flea, the bed bug and the scabies mite).

We can also classify parasites according to the position which they occupy in relation to the host. Most of them live inside its body and are called 'endoparasites'; some live on its surface and are called 'ectoparasites.' Some ectoparasites are only temporary parasites. The leech, the flea, the mosquito and the biting flies are only parasitic on the surfaces of their hosts while they are sucking the blood on which they feed. Other ectoparasites, such as *Sarcoptes scabiei* (which causes scabies), are permanent (obligatory) parasites. These are permanently committed to their hosts and cannot live apart from them.

In the case of some obligatory parasites, the juvenile stages alone are parasitic, the adult stage living non-parasitically in the outside world; while in others, the adult stage alone is parasitic. A good example of the former group is the ox warble fly, whose parasitic maggot lives on the pus in abscesses along the spine of cattle. It leaves these abscesses to form a chrysalis on the ground from which the adult fly emerges. The second group includes several parasites which cause serious disease in man. The large roundworm *Ascaris* (which lives in the small intestine and does not usually suck blood) belongs to this group; and so does the human hookworm (which is more important, because it feeds entirely by sucking blood through the wall of the small intestine).

The Hookworm

An idea of the amount of blood which a hookworm can suck is given by the study of the closely-related species, the hookworm of the dog. American and Japanese biologists have watched this species sucking blood in the opened intestine of anæsthetised dogs and have calculated that 20 of them could actually suck about a teaspoonful per day from a dog's intestine. If we add to this the blood lost by bleeding which occurs when the hookworms leave one part of the intestine to move to another, the total daily loss of blood is about doubled. It is hard to understand how any animal could survive such a loss for long and it is likely that each hookworm does not remove so much blood as this all the time. But these figures give us an idea of what they can do and explain why it is that human beings, and especially children, who harbour the human hookworm, become anæmic. Such children have been shown by American workers to harbour from 1 to 3,000 hookworms, a moderate infestation being from 100 to 500 of them, and the loss of blood in such children must be serious. Indeed, hookworms cause an enormous amount of illness, economic loss and many deaths in the

United States, South America, China, India and in other tropical and sub-tropical regions. Fortunately they do not occur in Great Britain, although they were formerly a scourge of our Cornish tin mines.

The parasite lives in the human small intestine and produces eggs which pass out with the fæces. The young hatch out of these eggs and live in the soil, provided that it is not too cold or hot and is damp enough. They enter the human body through the mouth or by boring through the skin. There they get into the blood vessels, are carried to the lungs and from these pass up the windpipe and down the gullet to the intestine.

Infection can be prevented by avoiding the contamination of food, water or soil by human fæces and by seeing that one's naked skin does not come into contact with soil containing the larvæ. This sounds easy enough to us, but it is by no means easy to ensure among more primitive populations. Nor is it easy to give whole populations vermicidal drugs to keep down the number of hookworms in them. For these reasons the policy now followed in the United States is to aim at so reducing the number of hookworms harboured that they do not cause appreciable disease, and at the same time to keep up the host's health by a well-balanced diet containing sufficient iron to help to cure the anæmia. The blood-forming organs are thus helped to replace the blood sucked off by the hookworms. In other words, we try to establish a host-parasite balance which will enable the host to be healthy.

The Pinworm

Another relative of *Ascaris* and the hookworm is the pin- or threadworm. This species has gone a step further in parasitism. Its young have lost the power to live in the outside world, so that the whole life-history is parasitic. The male and female worms live in the small intestine, and the female, before laying her eggs, descends the bowel and protrudes part of her body out of the anus. This she does chiefly at night. The eggs are laid in batches on the moist warm skin around the anus or even at considerable distances from it. The act of egg-laying causes irritation of the patient, loss of sleep and scratching. By scratching, the child or grown-up gets the eggs on to the fingers or under the finger nails and may then communicate them to its own mouth, so that it gets more worms; or they may be communicated to others.

They may also dry and be blown about (just as bacteria are) and they have been found in the dust of schoolrooms, dormitories and houses—or even on furniture, door-knobs, walls, etc. It is, therefore, not surprising that, if one child in a family is infected, the whole family may have the worms. It will also be clear that only the most scrupulous cleanliness will help to eradicate the infection and that, without this, it is no use at all to give drugs to kill the worms.

Intermediate Hosts

The broad fact about all the life-cycles hitherto considered is that they require only one host for their completion. We have now to consider parasites which require more than one kind of host. Such parasites cannot get directly from one animal to another through the skin or the mouth or in any other way. Their young have to get first into another animal and also have to go through certain stages of their development in it before they pass to another animal. This second host (the 'intermediate' or secondary host) often harbours the young stages of such parasites, while the host harbouring the adult stage is called the 'definitive' host. The intermediate host is usually a snail or a biting insect or tick.

Examples of this kind of parasite are those which cause malaria and sleeping sickness and also the tapeworms and the flukes. It is evident that they have taken a further step into parasitic life and will have greater difficulty in completing their life cycles. They show particularly clearly adaptations which help to ensure their survival. Chief among these is the enormous development of the reproductive organs. Their job is, of course, to produce so many eggs that, no matter how many fail to develop and complete their life-cycle, enough will do so to ensure that the parasite survives as a species.

Some parasites of man live in this way in other animals as well as secondary hosts, a fact which complicates the problems of their control. Such second animals may, for example, act as permanent reservoirs from which the infection may spread to man. The life-histories of this kind of parasite are never simple, but they can cause such serious human disease that we must consider one or two of them. We can take the tapeworms first.

The Tapeworms

The human tapeworm lives in the intestine and feeds on the food materials (especially on the carbohydrates) there. It has no intestine or mouth, but absorbs the already digested food through its skin. Its body is reduced to little more than reproductive organs and it produces enormous numbers of eggs, which are passed out in the fæces. These cannot develop further unless a particular secondary host eats them.

In the case of the species *Taenia solium*, this intermediate host is usually the pig. In the pig the embryo of the tapeworm develops into a small bladder or bladderworm ('cysticercus' as it is called), inside which there is a small tapeworm head. These bladderworms settle especially in the pig's muscles and there they remain until the pork is eaten. When this happens the small bladderworm develops in the human intestine into a tapeworm and the cycle begins again. But of course, if we cook pork sufficiently to kill the bladderworm, we do not get this tapeworm; nor shall we get it if we see that no human fæces, and therefore no eggs of *Taenia solium*, get anywhere near pigs.

There is, however, one important point to note about the life history of the pork tapeworm. Man can himself act as the intermediate host. He can infect himself with the eggs he has passed, or he can infect other people with them. Then these eggs develop into bladderworms in humans. They cannot develop further in them, of course (short of cannibalism!); but if they get on to the brain or any other vital organ, their pressure may cause symptoms like those of epilepsy and other serious or even fatal results.

The life-cycle of the beef tapeworm of man (*Taenis saginata*) is similar, but the intermediate host is the ox and not the pig, and the bladderworm stage will not grow in the human body. Another species (the broad tapeworm) which is prevalent in the Baltic regions, France, Switzerland, Russia, Japan, etc., requires not two, but three different hosts—a freshwater flea (*Cyclops*), a fish (pike, perch, grayling, etc.) and man himself. There are also various other species of tapeworm which may infect humans, among them *Dipylidium caninum*, whose normal hosts are dogs and cats and their fleas.

The Malaria Parasite

So far we have considered parasites which depend for the completion of their life-cycles either upon the eating of their eggs or of their intermediate hosts by another host, or on the penetration of their young into the blood of a new host. But there is another method of getting from host to host which is perhaps the most important of all to man. It is the method used by the parasites of malaria and sleeping sickness.

The malaria parasite is a small amœba which lives in the red blood cells of human blood. It grows in these until it fills the red cell and then it divides into a number of small parts. The red blood cell, which is by this time destroyed, bursts and liberates this brood of asexually produced young and they attack other red blood cells. This process of asexual multiplication may be repeated several times and each time that a brood of young is liberated, the patient gets an 'attack' of malaria. He shivers, has a rigor and a high temperature and feels very ill, as a result of the poisons set free by the parasites when the red cells burst. It is well known that these broods of young are liberated by some species of malarial parasite at regular intervals, so that the time of onset of the fever may be predicted.

There comes a time, however, when the parasite can no longer go on producing young asexually like this. A sexual process becomes necessary and this cannot take place in the human body. The parasite must get into a mosquito, and into a particular species of mosquito. It produces, in the human blood, male and female forms which cannot develop further there. When a mosquito of the right species sucks human blood containing these male and female forms, they pass to the mosquito's stomach, bore into its

wall and, after fertilising each other, produce millions of minute young which pass to the mosquito's salivary glands. When the mosquito again sucks human blood, these are injected into the blood and the same cycle begins again.

We note that it is the asexual process in the human blood which causes disease and that the mosquito apparently does not suffer at all. It is probable, therefore, that the parasite began in the mosquito, which has become adapted to it and only causes disease in man because it has comparatively recently come to use him as a second host. In some humans, indeed, it causes much less serious disease than it does in white people, who are new to the tropics where the parasite is commonest. This means that the native races have had malaria for so long that they have developed some degree of resistance to it; and the time may come when they will be as little affected by it as the mosquito is.

Noticeable also is the extreme dependence of the parasite on a narrow range of circumstances. It is restricted to only a few species of mosquito and to the females only of these, because it is only the female mosquito that sucks blood. Its dependence on the parasitic life is thus much more complete than that of the other parasites considered above. Its control is, for the same reason, much more clearly defined. If we can protect ourselves from the bites of the mosquito or can exterminate it in the areas where we live, there will be no malaria—and this is what we try to do. We use mosquito nets to protect ourselves from bites; we attack the young of the mosquitoes, which must live in water and yet must breathe air, by covering the surface of all stagnant water with oil which will prevent these young from getting at the air.

Characteristics and Control

There is not space to consider fully the very interesting effects of parasitism on the parasite and on the host. A parasitic life, like sedentary, aerial, freshwater or terrestrial life imposes certain modifications of structure upon the parasite. These may be so profound that the organism loses all resemblance to its ancestors. The tongue worm of the dog, for example, looks like a small flatworm, but is really descended from creatures of the group to which the lobster, the fly and the spider belong.

In general we may say that all parasites tend to undergo a simplification of structure. They tend to lose their locomotor and sense organs, because these are not needed for getting food, seeking a mate or for offence or defence. The parasite tends to rely for its survival upon the development of large and prolific reproductive organs which enable it to produce so many young that it can afford to lose large numbers in the task of completing the complicated life cycle. The biological efficiency with which the parasites

carry through these life cycles, their endless and very beautiful adaptations to their modes of life, and the great variety of these modes of life are among the most interesting and difficult problems of biology.

The problems of control are correspondingly intricate and varied. The degree of damage that parasites can do to man and to his civilisation is realised only by those who have to deal with them. In hard cash their damage runs into millions of pounds, even when modern methods of control are applied. In terms of illness, misery and death the damage is incalculable and some parasites can immobilise armies and stop wars, as the malarial parasite did among British, French, and German troops in Macedonia in 1916. It is known, also, that the victory of El Alamein was appreciably helped by the dysentery from which the Germans and Italians suffered.

We are indeed fortunate in Great Britain to be afflicted by only a few parasites, all of which must be reckoned among those which do least harm to man. But the present war is bringing our sons and daughters into contact with dangerous parasites in Africa and the East, which they may bring home with them. We took, a long time ago, measures to ensure that during this war, parasites now rare in this country do not again become prevalent here.

BIOGRAPHICAL NOTES

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THE SECURITY OF THE CHILD

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Security—National and Individual

The health of a nation depends on the health of its individual citizens and the security of a nation on the security of the individuals who compose it. To understand this we must know what exactly we mean by security. A nation may think to secure itself by building up mighty armaments or by acquiring immense wealth or may believe itself safe behind the bastion of the sea. The last two, if these things made for security, should have rendered our own nation for ever secure, and yet history has shown us that neither Weltmacht, money nor geography can ever ensure security without that inner moral security which we have had in sufficient amount, but only just in sufficient amount to bring us through this war. Neither nation nor individual can enjoy absolute security at all times and at all places; it is no use playing for safety for in the world as it is to-day there is no safety. Accidents will occur, miscalculations will be made and unexpected events will interrupt the most carefully calculated plans. Outer security will not keep us safe for ever, or even for long; what we require is an inner fortitude which will enable us to meet and overcome the accidents, correct the miscalculations and turn the unexpected events to our advantage. It may be that our nation is well endowed with such fortitude, but that is no reason why we should not seek to understand the basis of this virtue and try to foster it in the individuals of our race.

Innate Security

Fortitude will depend on self-reliance, and in order that self-reliance may be developed, we require that we should have a background of security from our earliest years and the establishment of that security must begin at birth. A good sound constitution inherited from our ancestors and the avoidance of accident and disease in early life are without doubt important contributions to our security, but the most important foundation is psychological. This feeling of security depends on the amount of care, protection and love which the young child gets from its parents, and especially from its mother. If there is a sufficient basis of confidence from the very beginning, then the fortunate individual will be well equipped to meet the slings of fortune in after life. Admittedly adversities may be so over-powering that

he cannot cope and he is overwhelmed in spite of his initial advantages, but for all ordinary purposes he will stand four square to the world and will be able to use such talents as he has to the best advantage.

The Establishment of Security

As a young infant, the person who is afterwards going to enjoy security requires to be fed regularly both as to amount and time, and if at all possible he should be breast fed. Apart from all physical advantages of breast feeding, the feeling of close physical contact with the mother is of great comfort to the infant. Moreover, the mother should give full attention to her child while she is feeding him. If she attends to something else the child will be dimly aware of 'neglect,' though of course he is too young to make any verbal protest and so the mother may not think she is doing him any harm. At the same time the infant must not feel that he is going to be let fall, or smothered by bed clothes or pillows, elementary precautions perhaps but not infrequently neglected. If primitive ancestral fears exist, they will be fear of the dark and fear of objects moving in the dark, the threats to our ancestors in the jungles. There is no point in leaving the young infant alone to go to sleep in the dark and, if he has to be without a light when he has gone to sleep, if anyone comes into the room and wakes him, let him be reassured by a familiar voice.

The young infant should not be left to cry, especially if he is frightened. Admittedly he may learn to play up his mother by crying whenever she is near and does not take him up, but the mother ought to be able to avoid this and to know when her baby is really distressed, by her intuition.

The Training of the Child

It should be remembered that infants and older children require training, and wise training is the essence of the establishment of security. As a rule training should be positive rather than negative. The child should be told what to do rather than what not to do; 'do's' rather than 'don'ts' are the best instruction. As a reaction to the excessive represssion of children by the parents of previous generations there was a vogue for allowing the child to do exactly what he liked—expressing himself, it was called. Occasionally it may work, but generally such methods end in disaster which, after all, is not surprising. A child has not the experience or power of judgment and foresight to guide his conduct, and he requires and prefers guiding reins and rules, though the less obvious and oppressive these are the better.

Rules for Parents

In the training of the child certain principles should always be remembered.

(1) Never give contradictory orders if it can possibly be avoided, and if it is necessary try so far as you can to make the child understand why he is told to do this at one time and forbidden to do it at another time.

(2) Take great care that one parent does not play against the other through the child, either by bidding against each other for the child's love by bestowing favours or treats, or by disparaging the other or holding up him or her as a bogey who is the person to inflict punishment.

(3) The surest way to disturb the security of the child is by making him the unwilling witness of parental quarrels, and the drunken or bad-tempered husband who physically or verbally attacks his wife is only equalled in the evil influence he exerts by the nagging or perpetually complaining wife.

(4) Always remember that the child, even the young child, is a personality, and therefore has a point of view. He is not a doll or a plaything. Owing to his inexperience this point of view may seem to the grown up to be silly or wrong, but nevertheless it should be respected. It is always better to treat the child emotionally as a little older than he is than to treat the older child as a baby.

(5) Intellectually it is another matter. Too often the grown-up forgets the limitations of the child's reasoning powers. Probably not till he is well on in his teens can a child really appreciate the consequence of his behaviour or see the logical sequence of his ideas. He will however have a vivid imagination and may weave fantasies which may appear absurd to the adult, but are of real importance to the child, who resents the scorn and disrespect which are too often paid to them.

(6) In this connection, do not expect too much of the child; do not press him too hard beyond his capacity either in work or games or he may well become discouraged and depressed and fail to do even as well as he might.

(7) Whatever his behaviour try not to be shocked or angry; always try as the preacher said to understand before you blame. Too often the primary cause of the child's misbehaviour is the misunderstanding of the parent and misunderstanding may be even more cruel than physical violence or neglect. It does not follow that punishment may not often be required, but both parents and children should fully understand why the punishment is being inflicted.

(8) Let the standards demanded of the child be as simple as they may, and if, as they should be, they are high then these standards must be applicable to the parents as well as to the child. Remember that the child does and should hero worship his parents, especially his father, and he will naturally be mystified if his hero tells him it is wicked to swear or to lie or to lose his temper and he then sees him do just those things which he said were so wrong.

The Importance of the Home

It must always be realised that it is a great misfortune for a child even when he is well on towards late adolescence to have to do without his parents—both his parents. Sometimes the broken home is inevitable; death and sickness are no respecter of persons, but to break a home in which there are growing children is never to be lightly considered. The day of the cruel stepmother or father is past to all intents and purposes, but all those concerned with the behaviour problems of children will agree that even the most conscientious step-parent rarely fills the role of the real parent and the child all too often shows signs of deprivation of what he expects in the way of parental and especially maternal love and so develops a sense of insecurity. Again it should be stressed that from the psychological point of view, what is important is what the child feels and thinks and not what the adult thinks he should feel or think or even what the adult thinks he does feel or think.

Security and the School

If the home is the main basis of security for the child, the school also has its responsibility, and the teacher will do well to remember certain rules just as should the parent.

(1) See to it that the child is not subjected to the demands of conflicting loyalties. It is well recognised that school and home must pull together or they will pull the security of the child apart. Either the child will be bewildered and unhappy or he will learn to play off home against school and parent against teacher, and certainly will not benefit either educationally or socially by his attendance at school.

(2) The vast majority of children enjoy school and go there happily. If they do not, there is a reason, and the teacher should try to find the reason before fault is found or punishment is inflicted. That is not to say that punishment may not often be deserved and beneficently imposed, but both child and teacher should be quite clear why it is being inflicted.

(3) If a child is aggressive or destructive this may be due to high spirits or just naughtiness, but it may mean that the child is trying to persuade himself that he is not unhappy and not insecure, and if this is so the bad behaviour will not be improved till happiness and security are restored.

(4) The aggressive child has a nuisance value and so is readily noticed and something is done about it, but the shy, silent child has no nuisance value and may be regarded as a 'good little thing.' Yet such silence and shyness may be the expression of deep-rooted insecurity which if not remedied may have far-reaching bad effects for its future life.

(5) Insecurity may be fostered by a constant sense and experience of failure, and this may be due to an effort on the part of parent and teacher to push the child both in work and games beyond his capacity. Some are more

dull than others, some are more clumsy than others, and the wind must be tempered to both sorts of shorn lamb.

(6) The very bright child may be bored if his capacities are not sufficiently stretched, and Satan soon finds mischief for idle hands, so the situations into which such mischief leads may soon undermine the child's security.

It is difficult for the teacher of a large class, whose personnel changes every year, to know every child, but the good teacher will learn the limitations and capabilities and peculiar characteristics of everyone, and will endeavour to adapt the demands made on the child to his capacities. In this way the child will feel secure at school, as it is hoped he has learnt to feel secure at home and a sure foundation will be laid for future happiness and efficiency.

Abnormal Behaviour

If a child's behaviour is peculiar or wrong there is a reason for this behaviour and the chances are that the reason is that the child for some reason feels insecure. The earlier security can be restored the less likely is serious and deep-seated harm to result, so when the child steals or lies or won't go upstairs in the dark or insists on performing some ritual before he goes to bed or unreasonably complaints of pains or aches, don't be cross or even frightened, but patiently set about trying to find out the cause and remember the importance of security. If you can't do this yourself do not delay in seeking the advice and help of the expert. The child is probably doing these things to protect himself against some fancied danger, real enough to him; or to bring himself forcibly to the notice of those whose love he hopes he will regain, although, from the adult's point of view, he takes the most peculiar ways to win the parents' affection. Perhaps the most striking mass demonstration of the indirect effects of a loss of security was the outbreak of bedwetting consequent upon evacuation. All such was not due to psychological causes, but the majority of cases were. The child was separated from his parents, his home and his street, and the uprooting made him afraid and desperate for notice and love, often a love which the most well-meaning foster parent could not at first give him. Nevertheless, as he settled down, if the foster parent was patient and not over anxious she was rewarded not only by a cessation of the bedwetting but by receiving from the child an overflowing love and affection, a reward which few adults can receive from a child without a great sense of satisfaction and thankfulness.

Homes for Our Children

Let all our children then be given their birthright of a home. If possible let it be a home harmoniously created by their parents and their brothers and sisters. If that is impossible let them still have a home with well-disposed foster parents who can and wish to win their love and confidence. If an

institution cannot be avoided because the parents can't or won't accept their responsibilities or the child is so far gone in its insecurity that no foster home can be found, let such institutions be small and run by those with a real love and understanding of children so that they can be as nearly a home as it is possible to make them. The good institution does excellent work, but it can never take the place of a good home, and a good home doesn't mean a wealthy house; a common living room and a rag doll where love is make a happier child than a well-appointed nursery and an indifferent mother. Give our children a sense of security and we need not fear for the future greatness of our nation.

BASIC NEEDS FOR HEALTHY LIVING

THE October 1944 issue of *The Medical Women's Federation Quarterly Review* contains an interesting statement of view on certain aspects of social medicine. Particularly valuable is the following paragraph on man's basic wants:

All primitive urges supply the energy for man's activities; in order that they may find effective and satisfying outlets, certain basic wants must be met. These include stability of family life, education in its widest sense, scope and training for suitable work, encouragement in the right use of leisure, opportunity for independence of thought and creative activities, and development of that spiritual outlook which alone can secure an active, happy and ordered society.

For the achievement of this ideal, the Medical Women's Federation presents the following as minimal essentials:—

1. The recognition of the vital importance of home and family life with opportunities for early marriage, and the provision of good living conditions within reach of all.
2. Training from an early age in the development of personal moral responsibility and social obligation.
3. Religious training both at home and at school.
4. Physical training together with instructions in the functions, hygiene and control of the body.
5. Training in the understanding and expression of the emotions.
6. Extension of education into adult life. This should include the teaching of parentcraft to both sexes, and opportunities for manual and creative work.
7. The encouragement of a high standard of literature and public entertainment, and of appreciation of beauty in Nature and Art.
8. The provision of suitable opportunities for social contacts and recreation.
9. Adequate provision for the disabled and for those who are inherently irresponsible.

SEX EDUCATION AND SOCIAL BIOLOGY

By T. L. Green, B.Sc., M.A., F.R.E.S.
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An Eight-Year Plan

The educational press has of late contained many references to the subject of sex education, interest in which will be accelerated by the Board of Education's recent pamphlet. Stress has, however, been laid chiefly on the emphasis of the need for such work rather than on the description of what is actually done in any particular school. The following short summary of such work may therefore be of interest. The plan is in active operation in a Direct-grant School which at present numbers some 750 boys, including the attached Preparatory School. About two-thirds of the boys are boarders, the rest day boys. All are included in the work to be described.

Like most schools, this one has experienced problems related to sex, and as in most such schools it had been left to the Headmaster, Housemasters and Chaplain to deal with such problems as they arose. In 1941 it was decided to review the whole problem and a committee, consisting of the Chaplain, a Housemaster and the Biology Master was asked to prepare a report. After studying the available literature and making use of collective opinions the committee formulated a plan which was discussed in great detail by the whole staff. The main points in the final plan now in use are:—

(*a*) It applies to every boy in the school and is operative during every year of his school life.

(*b*) The syllabus of work is planned to occupy a weekly period for one term of every year as a minimum, although opportunity exists for extending such work at other times (e.g. Chaplain discussing morality in Divinity periods, Biologist dealing with population problems).

(*c*) While sex education may be looked on as the starting point of the plan, the final scheme has much wider implications and might fitly be titled 'A Living World and Man's Place in it.'

(*d*) The existence of such a plan is in no way intended to deprive masters, especially Housemasters, of anything which they might consider to be their duty or privilege in dealing with boys.

(*e*) The implementing of the plan involves the co-operative work of a panel of 14 teachers whose special interests or special abilities and experience render them best qualified to deal with the work.

It was decided to make use of the help of women lecturers if they were available, such as the School Hospital Staff, a Matron and so on. War con-

ditions had temporarily added a woman teacher to the staff, and her lectures on sex and reproduction were very well received.

The School Medical Officer very willingly co-operated in the work although, in order to avoid an appearance of abnormality, the part he plays is small. It is, however, widely recognised that what he does is very important and could be undertaken by no one except a medical man. In particular he provides lectures for leavers on sexual hygiene—an important topic when so many boys are leaving school to go direct into the Services.

One of the most difficult points lay in deciding how boys should be grouped for this work. The Board's pamphlet makes it clear that this problem is one which is commonly met with. Many criteria for grouping exist—by age, by maturity, by classes, by houses, in small groups, in large groups, and so on. The final decision had to be based on administrative criteria as much as anything else, with the result that the basal unit is the single class, although several classes are sometimes combined. Thus the groups range from about 25 up to as many as 120. It was about this problem of the size of the instructional unit that the greatest divergence of opinion was met with; some teachers (among them the Chaplain) wanting small groups and others (especially the scientists used to impersonal techniques of lantern and film) favouring larger groups.

Parents were not consulted before the scheme was put into active operation, not because it was wished to ignore their views but because it was felt to be impossible to get comprehensive and complete opinions without a vast amount of work. No parent has expressed disapproval of the scheme as a whole and but one or two have taken exception to any part of it.

The syllabus is divided into three parts—for Preparatory School, Lower School and Upper School—and each part is further sectionalised to cater for the different ages. It has been worked out in very considerable detail, is very fully documented with book references, and a large number of books have been made available for the staff who operate it. These include a number which are loaned to boys who want to read them. There is provision for questions by boys both in the allotted periods and on the many other occasions made possible in boarding school life.

The Syllabus

In reading this summary, it must be remembered that the terminology actually used with classes is at all times suited to their individual requirements. Practical work is emphasised wherever possible.

PART ONE. Prep. School Stage. 3 years' work, 10 lessons during one term of each year.

First Year. The General Activities of Living Things.

Living and non-living.
Plants and animals.

The general functions of an organism.
Plant food—what they use, how they get it, where from.
Animal feeding—where from, how, why.
How new plants are formed—spores, seeds, cuttings, bulbs, etc.
How new animals are formed—eggs, living young, parental care, etc.
Dependence of young animals on their parents.
Provisions made for looking after the young.
Elementary ideas on sex differences.

Second Year. Your Body and How it Works.

The shape and parts of the body.
The skeleton.
The brain.
The sense organs and what they do.
Muscles and movement.
The gut and digestion.
The kidneys and excretion.
The reproductive system.
The heart and its work.
The lungs and respiration.

Third Year. The Hygiene of Living.

How the body gets and uses energy.
Food as the basis of growth and health.
Growing—what growth is and how it can be measured.
Factors affecting growth.
Work, exercise, sleep, rest and fatigue.
Sunlight and its importance to living things.
Disease and illness and how they arise.
Health a positive biological ideal.
The origin and growth of a new individual.
The birth of a new individual.

PART TWO. Lower School Stage. 3 years, 10 lessons during one term of each year.

First Year (Third Forms). Some Aspects of Evolution.

SECTION A. MAN'S PHYSICAL EVOLUTION.

Elementary ideas about evolution.
The record of the rocks.
How did evolution come about?
The history of Man.

SECTION B. THE EVOLUTION OF MIND.

Stages in the evolution of the brain.
Instinct and intelligence.
Tools and speech.
Evolution of ideas.

SECTION C. EVOLUTION OF SEX.

The cell—specialisation and division of labour.

The beginnings of sex—origin of male and female.
Sex cells and fertilisation.

Second Year (*Fourth Forms*). *More about Evolution.*

SECTION A. EVOLUTION OF SOCIETY.

The family as a unit.
Nomadism and agriculture.
Tribes, taboos and laws.

SECTION B. THE RISE OF THE STATE.

The early states.
Communications, exchange and war.
The idea of political interdependence.

SECTION C. SEX, REPRODUCTION AND THE FAMILY.

Animal and human families.
Breeding seasons, size of families.
Immaturity, infancy and childhood.

Third Year (*Remove Forms*). *Religion, Sex and the Individual.*

SECTION A. RELIGION AND LAW.

Origin and development of religion.
Some early religions.
Complex religions and the development of laws.
Law in relation to individuals and nations.

SECTION B. SEX AND THE INDIVIDUAL.

Primary and secondary sex characters.
Sex in relation to emotion, attitude and habit.
Coitus, fertilisation and offspring.
Development and birth of the new individual.

PART THREE. Upper School Stage.

The work for the Upper School would ideally be spread over two years, but a number of boys leave after the Fifth Form period and do not go into the Sixth. For this reason the work has to be planned as a one-year course, with a further chance of extended and more detailed work for those who stay on. By the time he starts in a Fifth form, every boy should have a detailed and accurate knowledge of the first principles of sex, especially in its individual aspects. To complete the work envisaged in this scheme it remains to give some consideration to the more sociological aspects. The type of topic dealt with is outlined in the following section.

First Year (*Fifth Forms*).

The elementary principles of inheritance.
Population problems and their significance.
Health, disease and society.

Family problems—age of marriage, age of parenthood, size of family.
Sources of knowledge and help—clinics, books, avoiding the 'quacks.'
Individual sex behaviour and habits.
Character and personality and their determinants.
The enemies of mental health—ignorance, fear, frustration, conflict, etc.
Some positive ideals of living.

Second Year (*Sixth Forms*).

Work in the Sixth Form is in general an extension of what has been done in the Fifth, although a few new topics are introduced and all can be treated in greater detail. The general theme is "On Being a Father," and Walker's book under this title makes a good framework for what is done. Every endeavour is made to show that family life demands a great deal more than the solution of mere sex needs and that all of its problems are such as can profitably be considered in objective terms and require the mutual co-operation of parents and of children. Apart from topics already named under the Fifth Form syllabus the following are worthy of note:—

Social and economic factors in the family, especially in relation to the age of becoming parents, spacing of children, and so on.
Should children be born in summer or winter?
Family limitation, contraception.
Parent-child and child-child relations.
The problems of the only child.
Mutual responsibilities in family life.
The physical and mental problems of early childhood.
Pre-school educational problems.

Needless to say, many of these suggestions (such as the inclusion of contraception) met with criticism. There appears, however, to be a real need for dealing with such topics. Everyday life will introduce them to the notice of boys very soon, and if parents continue to fail to undertake sex education in their families it is wiser to let schools provide it rather than neglect it or some aspects of it. The conditions of wartime make this particular problem a very pressing one.

In general this scheme appears to be more extensive than any described in the Board's pamphlet on sex education. Its most important feature, in the view of the committee responsible for designing it, is that it operates throughout school life and is a part of normal school routine. It has involved the overcoming of many problems and no one who helps with it feels that all the problems are yet completely solved, but its progress and reception are stimulants to further efforts. From the writer's point of view, the most impressive feature has been the way in which so many members of the staff of the school have given time and effort (often involving the preliminary mastering of knowledge in fields which were entirely new to them), to the operation of the scheme.

FILM NOTES

The following venereal disease films are available from the Central Council for Health Education. No charge is made but bookings should be made well in advance. These films are greatly enhanced in value if used in connection with approved lectures.

Details of films of value in connection with sex education were given in our January issue (Vol. II, No. 1, 1944) and of general health films in our July issue (Vol. II, No. 3, 1944).

1. Suitable for showing in public cinemas, etc., and to attract large audiences of the general public.

TRIAL FOR MARRIAGE. 16 mm. and 35 mm. Sound. 35 minutes.

The story of a young man who leaves his home town and his fiancée to work in London, and gets into a 'fast' set which leads him eventually to casual intercourse. His cousin, a doctor, invites him to a hospital where he sees the results of venereal infection. He offers himself for a blood test, but fixes the date of his wedding before the result is known. One night he has a dream that he is being tried (and found guilty) of seeking to marry while venereally infected. He wakes up and (the blood test indicating syphilis) postpones his marriage.

TEST FOR LOVE. 16 mm. and 35 mm. Sound. 35 minutes.

A girl working in a seaside town, misinterpreting the reason for her young man's leaving her for a short time, goes off with another man and contracts gonorrhoea. Her young man returns, but she tells him "it is too late" for her to marry him. Eventually she is treated and cured and the film ends happily with the lovers reunited.

2. Suitable for introducing the problems of venereal disease to groups of socially conscious citizens.

SUBJECT FOR DISCUSSION. 16 mm. and 35 mm. Sound. 15 minutes.

Aims at bringing discussion on venereal diseases out into the open. Hinges around an argument which takes place when it is suggested that a lecture should be given on V.D. at a mixed Civil Defence post. In the course of the argument the doctor tells the story of one family, two members of which are innocently infected and wins over the doubting members of the post. (Has an 'A' Certificate.)

3. Suitable for conveying the essential facts to an audience already interested in the problem.

SUBJECT DISCUSSED. 16 mm. and 35 mm. Sound. 15 minutes.

A venereal disease specialist, a woman doctor and Commander Campbell discuss venereal disease. The facts about syphilis and gonorrhoea (their cause, effects and treatment) are described in plain non-technical language. The urgent necessity for early diagnosis and treatment is emphasized, and stress is laid on the importance of free discussion about venereal diseases. For general adult audiences.

SOCIAL HYGIENE FOR WOMEN. 16 mm. and 35 mm. Silent. 25 minutes.

A simple account of the venereal diseases (causes, effects, facilities for treatment, importance of education), for audiences of nurses, health visitors, midwives, etc.

REVIEWS

RATIONAL MEDICINE, by Basil Graves. (Nicholson and Watson, London, 1944. Pp. 291. Price 12s. 6d.) With a foreword by Sir John Graham-Kerr.

This book is unusual and eminently readable. The writer has achieved not a little in holding together a story which brings in anything from a slit-lamp to a dissertation on the examination system. Eye work is the speciality which the author takes throughout to illustrate his points. He appears to advocate a sort of short cut in the training of the specialist, and rather suggests, for example, that the course for the intending ophthalmologist might be shaped, in regard to time and narrowed scope, on lines comparable with that for dentistry. Accordingly 'higher qualifications' (i.e., the F.R.C.S.) are deprecated in this connection. This many readers will surely regard as unfortunate. Very entertaining are the author's sallies on such topics as surgeons and ostentation, the philosophy of fees, and sociality *v.* technical efficiency as a condition of success. London's admitted predominance in regard to medical prestige is perhaps a little overstated, for many provincial teaching centres are also first class. The author is at his best on the subject of the general examination system and the reactions of adolescence to it, although like other critics of examinations he has no satisfactory alternative to offer. The book is certainly interesting and is likely to attract much attention and some criticism. A. M.

ENDOCRINE MAN, by L. R. Broster. (Heinemann, London. 1944. Pp. 144. Price 12s. 6d.)

Dr. Broster is surgeon to the Charing Cross Hospital and the thoughts and conclusions resulting from his pioneer work in the surgery of the adrenal gland have formed the groundwork for this "study in the surgery of sex." The book is clearly written and intelligible to the layman with an elementary knowledge of chemistry and biology. The relationship between the chemical control of the body through the hormones of the ductless glands and the nervous control through the cerebral and autonomic nervous systems is lucidly expounded. The normal mechanisms of sex are illustrated by the author's clinical experience of the effect of abnormalities of the adrenal glands and the deviations from normal sex behaviour and the normal sex characteristics which they produce.—J. A. S.

FUNDAMENTALS OF PSYCHIATRY, by Edward A. Strecker, M.D., Sc.D. (Heinemann, Medical Publications, London. 1944. Pp. 192. Price 12s. 6d.)

This book is a practical, up-to-date handbook of psychiatry for students and general practitioners. Nothing could be simpler than Dr. Strecker's account of the common clinical psychiatric conditions. No one could give more sensible advice on the management of such cases. Moreover, this book takes a balanced view of the 'drastic therapies'—prolonged narcosis, insulin treatment, drug and electric shock therapy and pre-frontal leucotomy.

Of special interest to sex educationists is Dr. Strecker's statement that "Ignorance of the concrete facts of sex is a rock against which the frail craft of mental adolescence is so often wrecked. Therefore, a well-planned effort should be made to discourage sexual rumination and phantasy by giving these children reliable sexual information. Moralizing sermons do little or no good and frightening admonitions are harmful." This is among the author's measures for the prevention of

schizophrenia. The reviewer agrees, and commends the book to students and practitioners.—I. F.

UNDERSTANDING THE YOUNG CHILD, by W. E. Blatz, M.A., M.B., Ph.D. (University of London Press. 1944. Pp. 270. Price 6s.)

This book is compiled by the author and an associated group of workers from Canada who came to England in 1942 and undertook the care and study of the children in the Nursery Training School, Garrison Lane, Birmingham.

It is a most interesting and enjoyable book. It is said to be written primarily for parents who want help in the important task of child training, but the book is a philosophy rather than a teaching of dogma and will probably be appreciated chiefly by those who have studied children in the Nursery School environment rather than by parents who have to look after them at home.

This is not a book for the uninitiated to take up and read from beginning to end but rather one for the expert to read in bits, for it is not superficial but the result of careful thought and deep learning. The writer appears unwilling to come to conclusions but he does state the facts he knows.

The title of the book must be the answer to its success. Having read the book, will the reader understand better the motivation of the behaviour of the young child? Undoubtedly he will. He may not know what he should do about it, but he will know why children do certain things, and this is most important.

The writer appreciates that a Nursery School is complementary to the home and not a substitution for it and has a very full appreciation of the responsibility that must lie with parents.

D. H. G.

PSYCHOLOGY AND THE SOLDIER, by Norman Copeland. (Allen and Unwin, 1944. Pp. 96. Price 5s.)

The author of this excellent little work, subtitled 'The Art of Leadership,' is a chaplain to the Forces, so he has been able not only to judge the needs and aims of leadership but to bring to his task that element of inspiration characteristic of the best men of his calling. It is also a primer of group psychology, but the absence of technical terms and the simple style with short sentences makes it extremely easy to read. Of the fourteen chapters, those on character and personality, morale and discipline are specially notable. While the emphasis is throughout on the special needs of the Army, this is a book to be warmly recommended to teachers, youth leaders and employers—indeed to anyone whose occupation puts them at the head of a group of others. It explains principles and gives practical advice for putting these into operation. If a word of disagreement is to be found it is that the author speaks of Cromwell as a great leader rather as Carlyle dealt with his 'heroes.' The reviewer prefers to regard Cromwell as a proto-fascist and no model to be followed in these days.

W. P. K.

SEX EDUCATION: A GUIDE FOR PARENTS, TEACHERS, AND YOUTH LEADERS, by Cyril Bibby. (Macmillan, 1944. Pp. 291. Price 7s. 6d.)

The cause of sex education should be greatly furthered by the publication of this original and brilliantly conceived work. It should find a wide circle of readers among parents, teachers and all those who are still hesitant as to the wisest methods to adopt. The author writes in his threefold capacity of scientist, teacher and parent and the book bears the unmistakable mark of authenticity. As the numerous examples of children's remarks and questions suggest, as the situations described make clear, the methods advocated are not the result of armchair theorisation but are culled from the garden of first-hand experience. Moreover, one is conscious

throughout of a sympathetic awareness of the child's point of view. At the same time we are left in no doubt as to the author's concern with the ultimate purposes of sex education, which must strive not only to give instruction in scientific facts and to interpret these facts in the light of the special characteristics of human creatures, but also to inspire men and women with the desire to reach a standard of behaviour worthy of the truly adult human being.

It is difficult to select special chapters when all are so valuable, but those on 'The Parent's Part' and on 'Sex Problems in the School' are amongst the most illuminating.

The chapter on children's questions should be of practical assistance to teachers embarking on any definite scheme of instruction since these are given for the most part in the very words in which they were asked and to some of the more difficult ones suggested answers are provided.

Much thought has been devoted to the appendices, which include a classified bibliography. The author's style is fresh and convincing and these qualities make the book engrossing to the ordinary reader.—V. D. S.

THE YOUNG DELINQUENT, by Cyril Burt, M.A., D.Sc., LL.D. (University of London Press, 4th and revised Edn. 1944. Pp. 662. Price, 21s.)

This standard work, first published in 1925, is now so well established that a new edition needs no commendation. Out of his probably unrivalled experience, Dr. Burt surveys the whole problem of juvenile delinquency, placing both natural and nurtural factors in proper perspective, and making wise yet common-sense suggestions for treatment.

If there be one minor criticism, it is that the more anachronistic footnotes (e.g. that on p. 240, where a reference to "So recently as last year" relates to figures for 1922–23) have not been brought up-to-date. But we are fortunate that in the middle of a world war Dr. Burt has found time to prepare a revised edition at all. A provisional assessment is now made of the wording of the 1933 Children and Young Persons' Act, and of the Child Guidance Clinics (of which it is encouraging to note that there are now over 70 in Great Britain); while fresh investigations are reported on the last decade's increase in the number of juvenile offences.

Apart from revision and additions, the original 'Burt' is here — solid without being stodgy, progressive without being cranky, sane without being unimaginative. For those teachers, doctors, social workers, etc., who have not yet read this work, it is to be hoped that the publication of the new edition will provide the necessary incentive.—C. B.

BRANCH STREET, by Marie Paneth. (Allen and Unwin. 1944. Pp. 128. Price 6s.)

This sociological survey should be read not only by those concerned with the care and upbringing of children in any walk of life, but by many who must be ignorant of the conditions revealed in this book with regard to one of London's slum streets of to-day, even if the facts presented cause feelings of revulsion and despair.

The author, not an Englishwoman, describes how she shared the spare time of a gang of slum children, whose club-room was first a street surface shelter and then a condemned house. While many will not agree with all the methods employed by the leader—and the author herself raises a number of searching questions in her summary—one feels that it is essential that people living in more fortunate places than Branch Street should realise the vast potential for evil that could emanate from such upbringings in the impressionable years of childhood. P. M. T.

A GUIDE FOR THE TUBERCULOUS PATIENT, by G. S. Erwin, M.D. (Heinemann, 1944. Pp. 115. Price 3s. 6d.)

Healthy and normal people will enjoy this book. They will discover how little their supposedly healthy lives conform to reasonable rules of hygiene. The lesson of tuberculosis is that we need not have it when we decline to tolerate its causes. So a manual meant for consumptive patients turns out to be a primer of health—in disguise. Dr. Erwin is a frank, blunt colonial who tells his story clearly, and removes professional humbug from between himself and the patients, their friends and relatives. Non-medical readers will not be put off by the technical words he necessarily uses, and anyone retaining merely the earnest and careful spirit in which these hundred pages are written will have a new view on that dreaded bogey, consumption, and will realise how the disease is conquerable by the vast miracles to which the human spirit can give birth. H. W.

EDIBLE FUNGI, by John Ramsbottom. (Penguin Books. King Penguin. Pp. 35. Colour Plates 16. 1943. Price 2s.)

This delightful little book is clearly meant not for mycologists, but for the general public; and it fulfils its purpose admirably. The classification of fungi has advanced far since the sixteenth century. When a British herbal commented "Fungi ben muscherons. . . . There be twoo maners of them, one maner is deadly and sleeth them that eateth of them, and be called todestoles, and the other doeth not." Most people in Britain to-day (though not in other countries or other ages) have insufficient faith in the accuracy of systematics to risk eating anything but the common 'mushroom.' This excellent book of simple descriptions and fine illustrations should extend considerably the fungal dietary of our people and should be in the pocket of all ramblers and campers. C. B.

SHORT NOTICES

CHILDREN OF THE U.S.A. (U.S. Office of War Information. 1944. Pp. 64. No charge.)

A delightfully illustrated booklet which all schools should try to procure for the library table. It shows American children at home, at school, at college, on the farm, in youth organisations, at play, at church, in sickness and in health; each page consisting of excellent photographs with descriptive legends.

A NOTE ON THE VITAL STATISTICS OF LUTON, by Fred. Grundy, M.D., D.P.H. (The Leagrave Press, Luton. Pp. 36. Price 6d.)

Simply written and well illustrated by easily understood graphs, this booklet surveys the trends of Luton's population, structure, birth and illegitimacy rates, maternal and infantile mortalities disease incidence, etc. The author is to be congratulated on the preparation of the report and his Public Health Committee on deciding to have it published.

A SURVEY OF ALCOHOL EDUCATION IN ELEMENTARY AND HIGH SCHOOLS IN THE UNITED STATES, by Anne Roe, Ph.D. (*Quarterly Journal of Studies on Alcohol*, New Haven, U.S.A., 1943. Pp. 131.)

Should be valuable for teachers who are anxious to give instruction on the physiological effects of alcohol, but wish it to be based on fact rather than prejudice.

ORDINANCE AND CODE REGULATING EATING AND DRINKING ESTABLISHMENTS. (U.S. Public Health Service, Washington, D.C. Pp. 60, figs. 11.)

Will be of interest to all responsible for the organisation of communal feeding.